HDX101 Powerline HD Ethernet Adapter User Guide

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NETGEAR

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Es wird hiermit bestätigt, daß das HDX101 Powerline HD Ethernet Adapter gemäß der im BMPT-AmtsblVfg 243/1991 und Vfg 46/1992 aufgeführten Bestimmungen entstört ist. Das vorschriftsmäßige Betreiben einiger Geräte (z.B. Testsender) kann jedoch gewissen Beschränkungen unterliegen. Lesen Sie dazu bitte die Anmerkungen in der Betriebsanleitung.

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It is hereby certified that the HDX101 Powerline HD Ethernet Adapter has been suppressed in accordance with the conditions set out in the BMPT-AmtsblVfg 243/1991 and Vfg 46/1992. The operation of some equipment (for example, test transmitters) in accordance with the regulations may, however, be subject to certain restrictions. Please refer to the notes in the operating instructions.

Federal Office for Telecommunications Approvals has been notified of the placing of this equipment on the market and has been granted the right to test the series for compliance with the regulations.

Product and Publication Details

Model Number:	HDX101
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About This Manual

This guide describes how to install, configure and troubleshoot the HDX101 Powerline HD Ethernet Adapter.The information is this manual is intended for readers with intermediate computer and Internet skills.

Audience, Scope, Conventions, and Formats

This reference manual assumes that the reader has basic to intermediate computer and Internet skills. However, basic computer network, Internet, firewall, and VPN technologies tutorial information is provided in the Appendices and on the Netgear website.

The conventions, formats, and scope of this manual are described in the following paragraphs:

- **Typographical Conventions.** This manual uses the following typographical conventions::

Italics	Emphasis, books, CDs, URL names
Bold	User input
`Fixed`	Screen text, file and server names, extensions, commands, IP addresses

- **Formats.** This manual uses the following formats to highlight special messages::

	Note: This format is used to highlight information of importance or special interest.

	Tip: This format is used to highlight a procedure that will save time or resources.

	Warning: Ignoring this type of note may result in a malfunction or damage to the equipment.

	Danger: This is a safety warning. Failure to take heed of this notice may result in personal injury or death.

- **Scope.** This manual is written for the Powerline HD Ethernet Adapter according to these specifications:

Product Version	HDX101 Powerline HD Ethernet Adapter
Manual Publication Date	February 2007

	Note: Product updates are available on the NETGEAR, Inc. Web site at *http://kbserver.netgear.com/products/HDX101.asp*.

How to Use This Manual

The HTML version of this manual includes the following:

- Buttons, > and <, for browsing forwards or backwards through the manual one page at a time
- A TOC button that displays the table of contents and an Index button. Double-click on a link in the table of contents or index to navigate directly to where the topic is described in the manual.
- A Knowledge Base button to access the full NETGEAR, Inc. online knowledge base for the product model.
- Links to PDF versions of the full manual and individual chapters.

How to Print this Manual

To print this manual you can choose one of the following several options, according to your needs.

- **Printing a Page in the HTML View**.

  Each page in the HTML version of the manual is dedicated to a major topic. Use the *Print* button on the browser toolbar to print the page contents.

- **Printing a Chapter**.

  Use the *PDF of This Chapter* link at the top left of any page.

  — Click the *PDF of This Chapter* link at the top right of any page in the chapter you want to print. The PDF version of the chapter you were viewing opens in a browser window.

  — Your computer must have the free Adobe Acrobat reader installed in order to view and print PDF files. The Acrobat reader is available on the Adobe Web site at *http://www.adobe.com*.

  — Click the print icon in the upper left of the window.

Tip: If your printer supports printing two pages on a single sheet of paper, you can save paper and printer ink by selecting this feature.

- **Printing the Full Manual**.

  Use the *Complete PDF Manual* link at the top left of any page.

  — Click the Complete PDF Manual link at the top left of any page in the manual. The PDF version of the complete manual opens in a browser window.

  — Click the print icon in the upper left of the window.

Tip: If your printer supports printing two pages on a single sheet of paper, you can save paper and printer ink by selecting this feature.

Revision History

Part Number	Version Number	Description
202-10163-01	1.0	Original document.
202-10163-02	1.1	Product update: New configuration utility 1.0.1.3
202-10163-03	1.2	Product update: New configuration utility 1.0.1.4. New sections added for product upgrades and resetting devices to factory default settings.

Chapter 1
Introduction

Congratulations on your purchase of the NETGEAR® HDX101 Powerline HD Ethernet Adapter. The Powerline HD Ethernet Adapter lets you completely network your home by simply plugging into your existing electrical wiring, so your network connection is as close as the nearest power outlet. Now your high-speed cable/DSL connection can be available in every room. And you can also extend an existing Ethernet network to PCs in other rooms without any additional wiring.

This chapter describes the features of the NETGEAR HDX101 Powerline HD Ethernet Adapter.

Key Features

Note: This manual provides information on the complete features as of the date of publication. Earlier versions of this product may not have all the features presented in this manual. Go to *http://kbserver.netgear.com* where you will find product firmware updates for your HDX101.

The Powerline HD Ethernet Adapter provides the following features:

- Data encryption for the Powerline network.
- Easy installation and management utility
- Powerline network ID
- Front panel LEDs for easy monitoring of status and activity.

Easy Installation and Management

You can install, configure, and operate the HDX101 Powerline HD Ethernet Adapter within minutes after connecting it to the network. The following features simplify installation and management tasks:

- Browser-based management

  The setup utility allows you to easily configure your Powerline HD Ethernet adapter from almost any personal computer running Windows 2000, Windows XP, and Windows Vista. The utility allows you to set up a Powerline network ID.

- Visual monitoring

  The Powerline HD Ethernet Adapter's front panel LEDs provide an easy way to monitor its status and activity.

Maintenance and Support

NETGEAR offers free technical support seven days a week, twenty-four hours a day, for 90 days from the date of purchase.

Package Contents

The product package should contain the following items:

- An HDX101 Powerline HD Ethernet Adapter.
- *HDX101 Resource CD*, including:
  - This guide.
  - HDX101 configuration utility
  - *HDX101 Installation Guide*.
- Registration, Warranty Card, and Support Information Card.

If any of the parts are incorrect, missing, or damaged, contact your NETGEAR dealer. Keep the carton, including the original packing materials, in case you need to return the Powerline HD Ethernet adapter for repair.

Connectors, Ports, and Label Information

Each unit has various status indicators and a label with important information. Familiarize yourself with these features of your product.

The Powerline HD Ethernet Adapter

The front panel of the HDX101 contains the status lights described below.

Figure 1-1

You can use the status lights to verify connections. Viewed from top to bottom, the table below describes the lights on the front panel.

Table 1-1. Status Light Descriptions

Label	Activity	Description
Power	On Green Solid Off	Power is supplied to the HDX101. Power is not supplied to the HDX101.
Powerline Link	On Blue Solid Off	The device has detected another Powerline device on the Powerline network. No other Powerline devices detected on the Powerline network.
Ethernet	On Green Solid Blink Off	The Ethernet port is linked but there is no activity. Data is being transmitted or received over the Ethernet port. There is no active Ethernet connection.

The Label on the Rear Panel of the HDX101

The label on the rear panel of the HDX101 contains the items listed below.

- MAC address
- Model number
- Serial number

Chapter 2
Installing the Powerline HD Ethernet Adapter

This chapter describes how to set up the HDX101 Powerline HD Ethernet Adapter on your local area network (LAN) and connect to the Internet.

How the Powerline HD Ethernet Adapter Fits in Your Network

HDX101 devices allow you to implement or extend an Ethernet local area network anywhere in your house using your existing electrical power line in place of a dedicated LAN wiring infrastructure. An example is illustrated in the following diagram for a minimal network consisting of two Powerline devices:

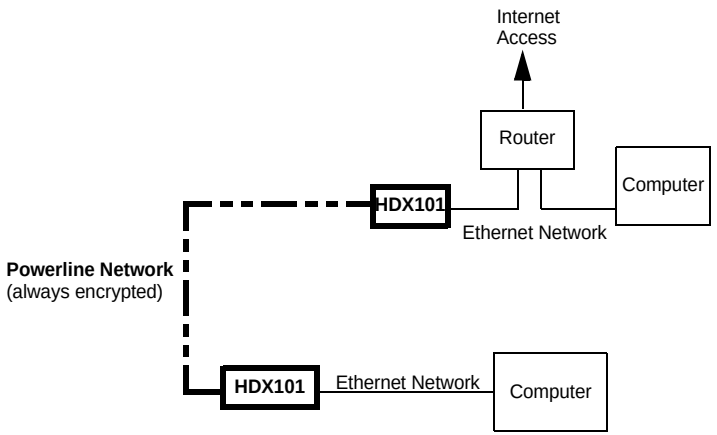

Figure 2-1

Follow the instructions below to set up your Powerline HD Ethernet adapter.

Prepare to Install Your Powerline HD Ethernet Adapter

Check that these minimum requirements are met.

- Your Ethernet network is set up and an Ethernet port is available on your router.
- Your Internet connection is working.
- Each computer and peripheral device to be used on your network has an Ethernet port.

Connect an HDX101 to the Router

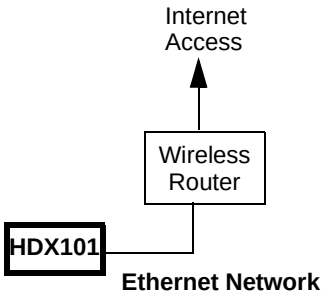

Figure 2-2

1. First, connect a Powerline HD Ethernet Adapter to a LAN port on the router so that the Powerline network can gain access to the internet.

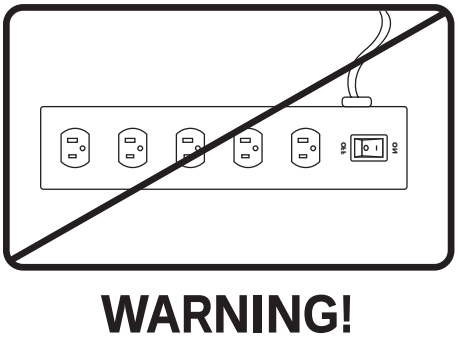

Figure 2-3

Do not connect the HDX101 Powerline HD Ethernet Adapter to a power strip, extension cord, or surge protector as this may prevent them from working properly or degrade the network performance.

a. Plug the blue Ethernet cable that came in the box into a LAN port on your router or switch in your network.

b. Plug the other end of blue Ethernet cable that came in the box into the HDX101.

- *Power*: The power light should turn solid green. If it does not, see Chapter 3, “Troubleshooting”.
- *Ethernet:* The Ethernet light should be blinking to indicate activity. If not, make sure the Ethernet cable on the HDX101 you connected in the previous step is securely attached to the HDX101 and the router, that the router is connected to the modem, and the router and modem are powered on.

c. Make sure that the internet port of your router is connected to your modem, and your computer is connected to a LAN port on the router.

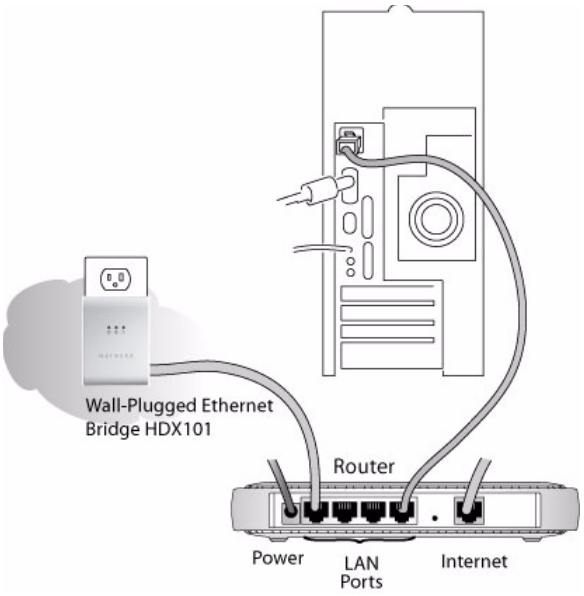

Figure 2-4

Connect other Powerline HD Ethernet Adapters

1. Plug your other HDX101 devices into power outlets in your home near to the other computers and peripherals to be included in your Powerline local area network.
2. Use an Ethernet cable to connect from an Ethernet port on each of the computers/peripherals to the nearest HDX101 device.
3. Check that when a second HDX101 is plugged into a power outlet, the blue Powerline LEDs turn to solid on.

This completes the Powerline installation.

Install the HDX101 Configuration Utility (Highly Recommended)

The utility provides you with the option of setting your own unique encryption Powerline network ID and prioritizing traffic passing through the Powerline network.

Important encryption features:

- The Network ID is case sensitive.
- Each device must be set to exactly the same Network ID—if they are to communicate on the same network. Powerline devices on different networks will not be able to communicate.
- A default button in the configuration utility allows you to reset the Network ID to the default (PowerlineHD).
- The Network ID allows you to protect your network from unauthorized access via the Powerline network.

1. Insert the *HDX101 Resource CD* into one of the CD-ROM drives on the computer that is connected to your router[1]. The CD should start automatically and display the following screen:

Figure 2-5

If the CD does not start automatically:

- Go to My Computer on the Windows Start menu, and double-click the drive that represents the location of the *HDX101 Resource CD* or
- Select the CD-ROM drive and click on the Autorun.exe executable file.

2. Click the topmost button, labelled **Install Software**. A Welcome screen should appear.

Figure 2-6

1. All devices on a Powerline network can be managed from one computer. If you add another HDX101 device to an existing Powerline network, you can install the Powerline configuration utility on the computer connected locally to the new HDX101 device, or open the utility on the computer originally used to set up the Powerline network ID. You can use any computer to manage the network, but this procedure assumes that you are working from the computer that is connected to your router.

3. Click **Next** to display a window that allows you to choose the installation location.

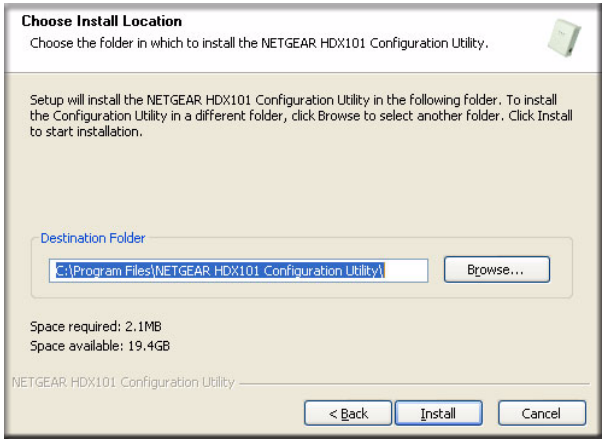

Figure 2-7

4. Either click **Browse** to change the location where files will be saved on your hard drive, or click **Install** to accept the default location.

5. If you choose to change the destination location for the files, the following popup window will be displayed:

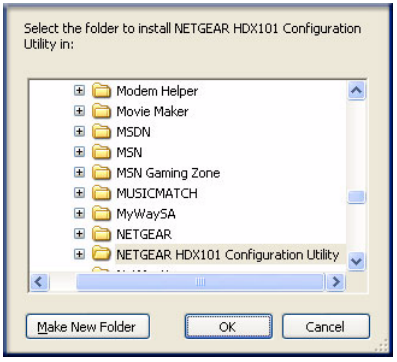

Figure 2-8

   a. Select a folder or click **Make New Folder** to create a new folder, and then click **OK.**

   b. When the active window returns to the main InstallShield dialog shown in Figure 2-7, click the **Install** button to continue the installation.

6. If your computer does not include a current version of WinPcap, the InstallShield Wizard will display a dialog box to indicate that it must install WinPcap.

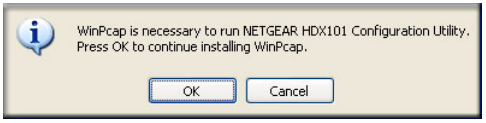

Figure 2-9

Click **OK** to install WinPCap and follow the on-screen instructions until the following window is displayed.

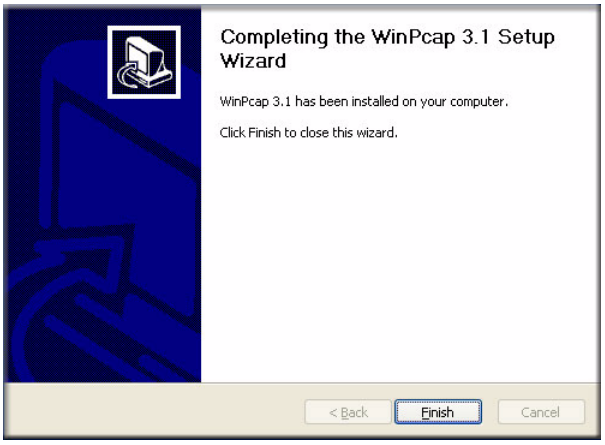

Figure 2-10

Click the **Finish** button to continue the installation of the HDX101 Configuration Utility.

7. After WinPcap is installed, the InstallShield Wizard will indicate the HDX101 Configuration Utility has been installed.

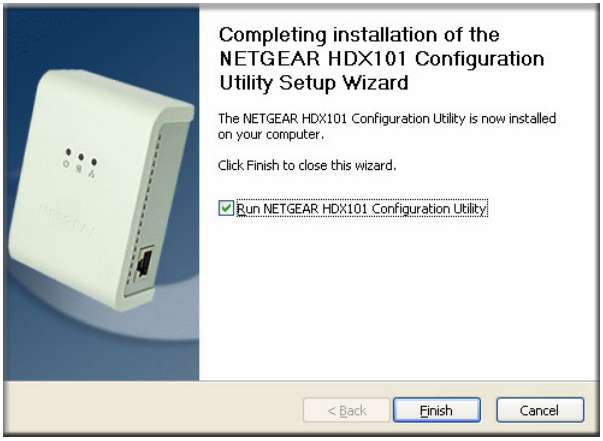

Figure 2-11

To launch the program, make sure the “Run NETGEAR HDX101 Configuration Utility” button is checked. Click the **Finish** button to close the InstallShield Wizard.

Running the HDX101 Configuration Utility

When installation is complete, you can run the utility by clicking an icon on your desktop or from the Windows Program Menu. The utility will display its main page as shown below.

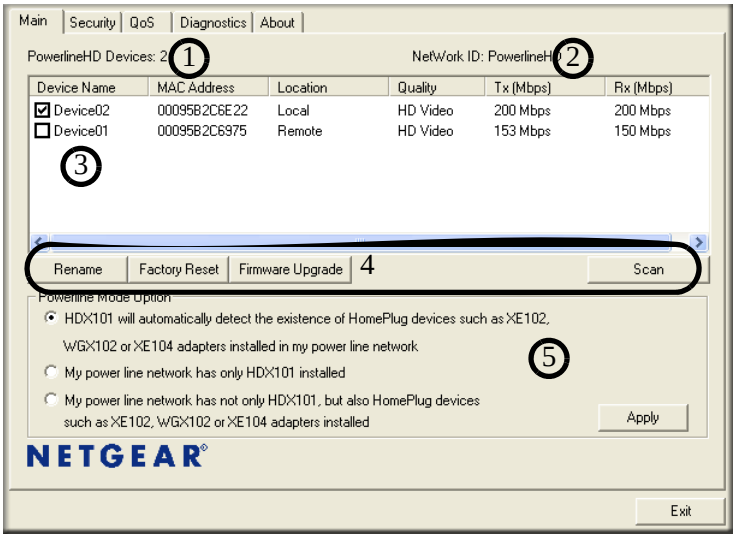

Figure 2-12

The screen is divided into 5 major areas:

1. Powerline Scan Status—reflects the auto-scan status, indicating whether the utility is currently scanning for Powerline devices, or the number of Powerline devices detected, after the scan has completed.
2. Network ID—indicates the network ID of the local Powerline device. All devices shown in the device table (3) share the same network ID.
3. Device Table—shows basic information about the Powerline devices. The table has 6 columns: Device Name, MAC Address, Location, Quality, Tx (Mbps), Rx (Mbps).
    - The Device Name column contains two items: a checkbox and a device name. A checkmark means that the device is selected so that its network ID can be changed. The device name is initially set by the utility.
    - The MAC Address column indicates the physical address of the Powerline device.
    - The Location column indicates whether the device is local or remote. The local device is the one connected, via an Ethernet cable, to the PC running this utility.

- The Quality column indicates the type of traffic that can be handled smoothly: HD Video, DVD Video, or Data.
  - HD Video means that the device can handle high-definition video traffic smoothly. This status will be shown if the transmit and receive link speed is greater than 80 Mbps.
  - DVD Video quality implies that the transmit and receive link speed is greater than 50 Mbps.
  - Data quality means that the device cannot handle video data smoothly. This status will be shown if the transmit or receive link speed is less than 50 Mbps.
- The Rx (Mbps) column shows the maximum receive link speed of the device.
- The Tx (Mbps) column shows the maximum transmit link speed of the device.

4. Control Buttons—consisting of 4 buttons. These buttons allow you to change a device name, reset a device to its factory defaults, manually apply a firmware upgrade, or force the utility to scan the network for Powerline devices. For details about setting your devices back to their factory defaults, see "Resetting to Factory Defaults" on page 2-14. For details about manually applying a firmware upgrade, see "Manually Applying a Firmware Upgrade" on page 2-13.
5. Powerline Mode Option group. The options in this group configures how the network will coexist with HomePlug devices. For more details on this option, see "Allowing Your Powerline Network to Coexist with a HomePlug Network" on page 2-17.

Automatic Firmware Version Check

The first time you run the configuration utility, the software automatically checks the firmware version of all devices in the Powerline network, starting with the local device. If the firmware in the local device is old, the software will display the following message box:

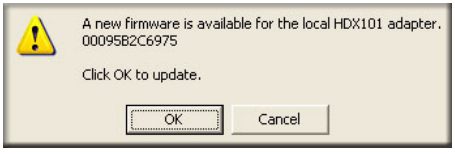

Figure 2-13

If the firmware in the local device is up-to-date, but the firmware on one or more remote devices is old, the software will display the following message box:

Figure 2-14

Note: You can only perform an upgrade with the local device. If the firmware is out-of-date on remote devices only, start the following procedure from step 4.

To upgrade the firmware:

1. Click the **OK** button. The upgrade process will start automatically, and the following progress screen will be displayed:

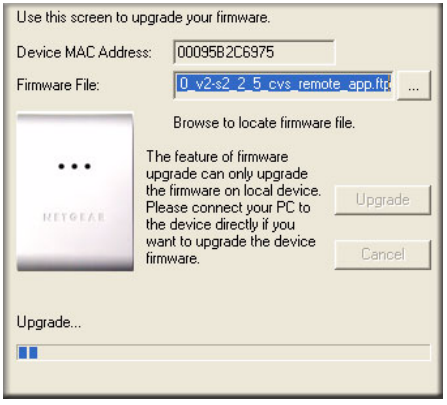

Figure 2-15

2. On successful completion of the upgrade, the following message will be displayed:

Figure 2-16

3. Click the Diagnostics tab, and check the last column, Firmware Version, in the Device History table.

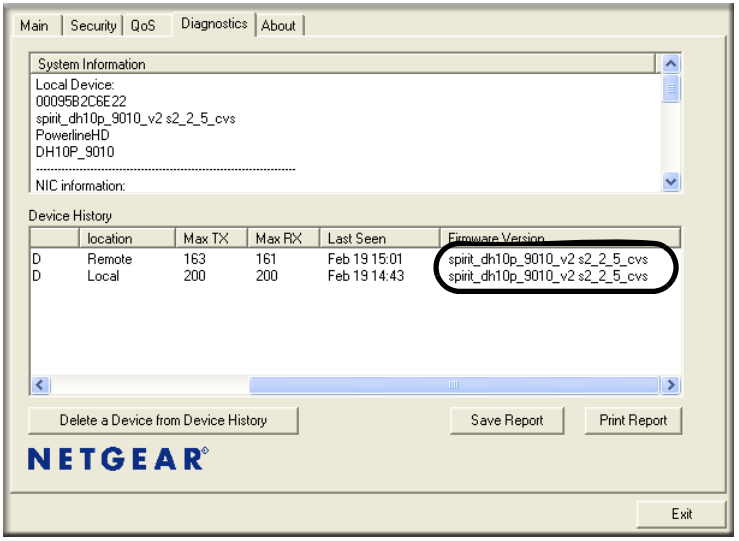

Figure 2-17

4. If a remote HDX101 Powerline HD Ethernet Adapter does not have the same firmware version as the one installed on the local device, connect your PC to that adapter and repeat the upgrade process. If necessary, click the **Firmware Upgrade** button in the main window and accept the default firmware file to start the upgrade process.

Manually Applying a Firmware Upgrade

The automatic firmware check, described above, only occurs if the firmware in your network devices is older than the firmware that was bundled with the HDX101 Configuration Utility. However, you can also download new firmware and install it as follows:

1. Go to the HDX101 support page at *http://kbserver.netgear.com/products/hdx101.asp*. If you see a recent firmware image to download, follow the download instructions on the support site, and take note of where you save the downloaded file on your PC. If the file you downloaded is a .zip file, extract the encapsulated firmware file and note its name and location on your PC.
2. With the Main tab selected in the HDX101 Configuration Utility, click the **Firmware Upgrade** button. The following window will be displayed:

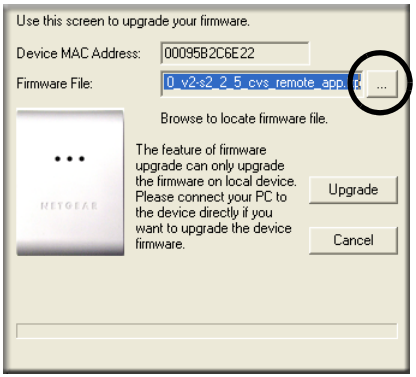

Figure 2-18

3. Click the browse button, circled in the diagram above, and navigate to the location on your PC where you saved the firmware file. The file should have an extension of .ftp, .img, or .nvm.
4. With the downloaded firmware file selected, click the Upgrade button.
5. One by one, connect your PC to the other HDX101 Powerline HD Ethernet Adapters in your network and repeat steps 2-4 above.

Resetting to Factory Defaults

This option returns the Network ID to the default value of “PowerlineHD” and the Powerline Mode Option to autodetection mode. Only one device at a time can be reset.

	Note: Because the Network ID is reset, the device will be disconnected from the network if, before resetting the device, the Network ID was not the default. Therefore, make sure you reset all your remote devices before you reset the local device.

To reset all the devices in your network to the factory defaults, proceed as follows:

1. For each remote device in your network, click the device name to highlight it.

> **Note:** Because only one device in a system can be reset at a time, the checkboxes are *not* used to select devices for this type of operation.

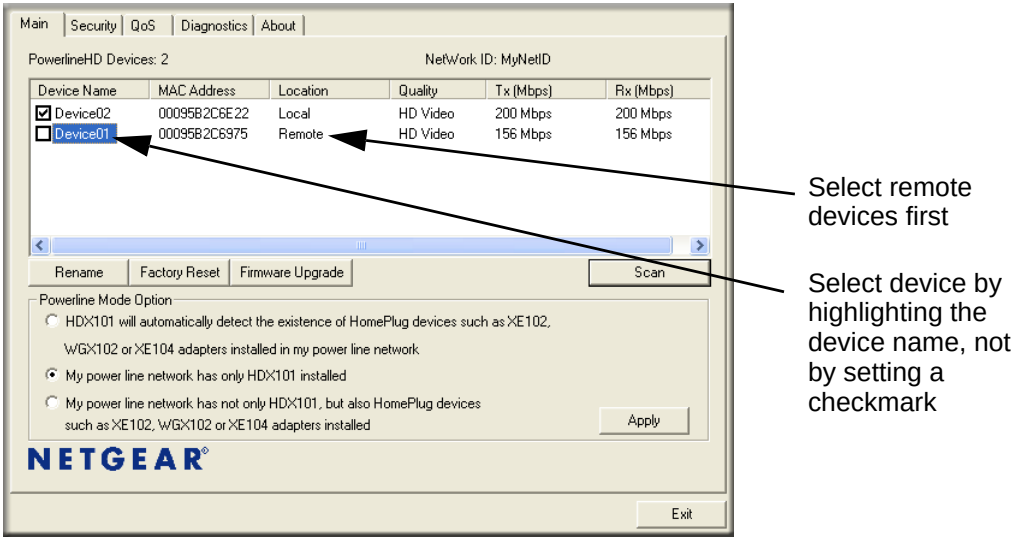

Figure 2-19

a. Click the **Factory Reset** button. The software will display a message similar to the following:

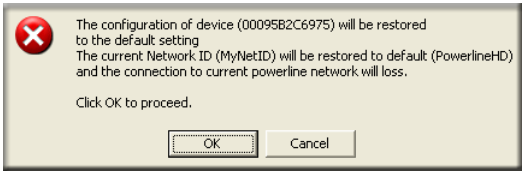

Figure 2-20

b. Click the **OK** button to reset the device. The software will display a message to indicate whether or not the operation succeeded.

Figure 2-21

c. Click the **OK** button to dismiss the message box and continue.

2. Once all remote devices have been reset, repeat step 1 for the local device. After the device is reset and the software finishes scanning, check that the device table lists all devices in the network again.

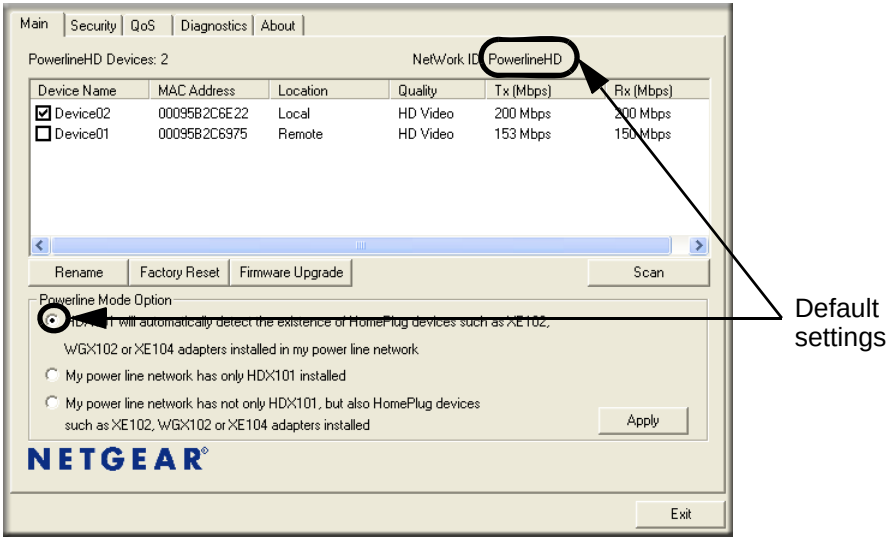

Figure 2-22

Allowing Your Powerline Network to Coexist with a HomePlug Network

This section only applies if your AC power lines host an existing HomePlug network, comprising of devices such as NETGEAR XE102, WGX102, or XE104 adapters.

By default, HDX101 devices will automatically detect HomePlug devices and, if present, will automatically switch the HDX101 network into a co-existence mode where the HDX101 devices will not interfere with the HomePlug devices. If you experience difficulty with communications on your HomePlug network, you can force the HDX101 network into co-existence mode as follows:

1. Make sure that all Powerline devices are plugged into AC power outlets.
2. Start the HDX101 Configuration Utility and ensure that the **Main** tab is selected.
3. Wait for the utility to detect the HDX101 Powerline HD Ethernet Adapters that you connected in step 1.

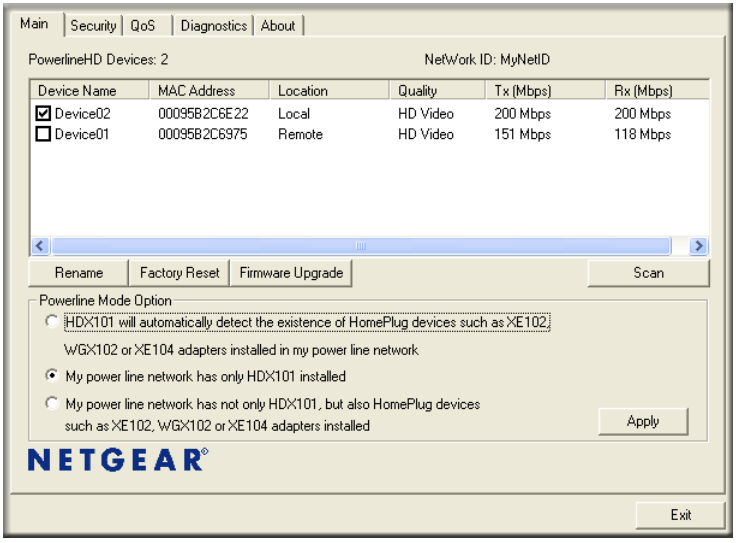

Figure 2-23

4. Click every empty checkbox in the Device Name column so that a check mark is displayed for every device.
5. Change the Powerline Mode Option as follows:

a. Click the radio button labelled “My power line network has not only HDX101, but also HomePlug devices such as XE102, WGX102 or XE104 adapters installed”.

b. Click the **Apply** button.

Note: HomePlug devices cannot communicate with HDX101 devices on a Powerline network directly. However, devices on a Powerline network can communicate with devices on a HomePlug network if both networks are connected to a router, router/modem, or gateway device. The following diagram shows a typical mixed Powerline and HomePlug configuration.

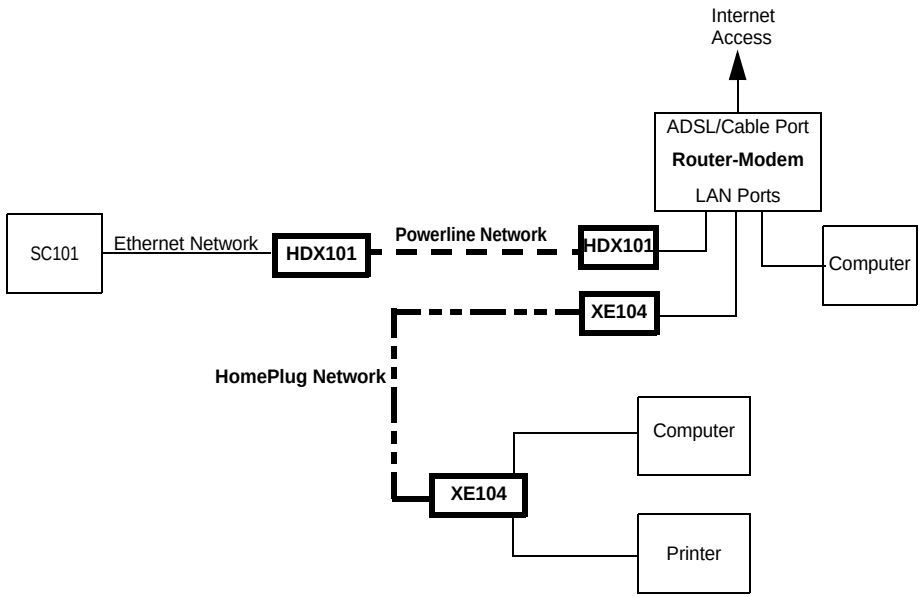

Figure 2-24

Set Your Network ID

The fastest and most reliable way to set the network ID is to set the ID for all devices at once.

1. Make sure that all Powerline devices are plugged into AC power outlets.
2. If you have not already done so, start the HDX101 Configuration Utility and ensure that the **Main** tab is selected.
3. Wait for the utility to detect the HDX101 Powerline HD Ethernet Adapters that you connected in step 1.

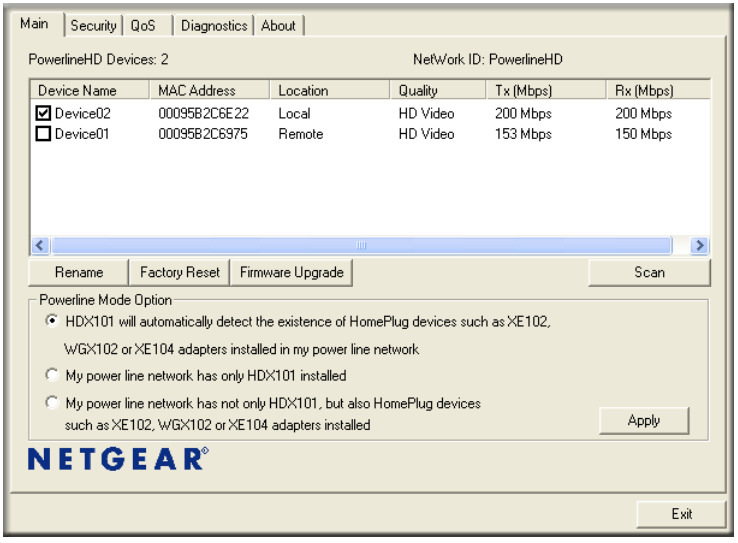

Figure 2-25

4. Click every empty checkbox in the Device Name column so that a check mark is displayed for every device.
5. Set the Network ID as follows:

c. Select the **Security** tab.

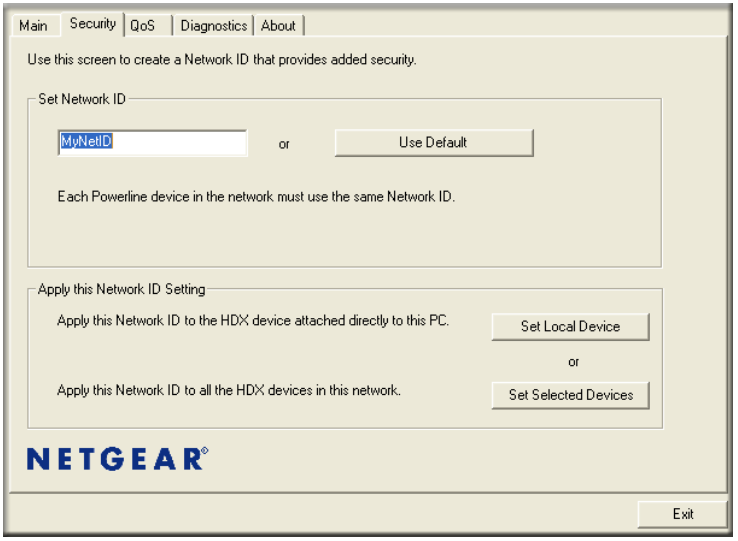

Figure 2-26

d. Type a network ID in the **Network ID** text box.

e. Click the **Set Selected Devices** button.

The utility should display a pop-up window indicating that the operation was successful.

f. Select the **Main** tab again and click the **Scan** button. Check that the utility detects all the Powerline HD Ethernet Adapters in your Powerline network and that your Network ID is displayed above the device table as circled below.

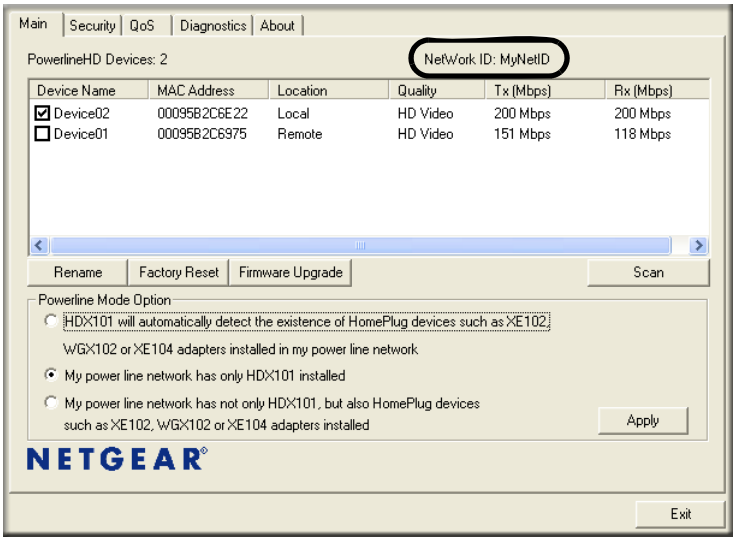

Figure 2-27

Add a Device to an Existing Powerline Network

If you are adding a device to a Powerline network where the network ID has been left at its default setting, all that is required is to plug the new device into a power outlet.

If the network ID has been customized, then the HDX101 Configuration Utility needs to be run in order to add the new device to the established network. The procedure for setting the Network ID depends on whether the computer running the HDX101 Configuration Utility is connected directly to the new Powerline HD Ethernet adapter (local) or is connected to a different device in the Powerline network (remote).

To Add a New Device from a Locally Connected Computer

1. Plug the new Powerline HD Ethernet adapter into an available AC power outlet and connect its Ethernet port to an Ethernet port on the computer.
2. Start the HDX101 Configuration Utility, select the **Main** tab. Wait for the utility to detect the new device.
3. Make sure a check mark is displayed in the Device Name column for the device marked as ‘Local’ in the Location column.
4. Select the **Security** tab.
5. Type the network ID into the **Network ID** text box and click the button labelled **Set Local Device.**
6. Select the **Main** tab again and click the **Scan** button. Check that the other devices in the Powerline network appear in the device list. It may take a minute or two for all devices in the network to be detected.

To Add a New Device from a Remotely Connected Computer

1. Plug the new device into an AC power outlet.
2. Start the HDX101 Configuration Utility and wait for the utility to detect the Powerline HD Ethernet adapters in your Powerline network. Check that all the Powerline HD Ethernet adapters in the established network are displayed in the main window.
3. Click every empty checkbox in the Device Name column so that a check mark is displayed for every device.
4. Select the **Security** tab and click the **Use Default** button. The ID listed in the **Network ID** text box will change back to the default, **PowerlineHD**.

5. Click the **Set All Devices** button.
6. Select the **Main** tab and click the **Scan** button. Wait for the new Powerline HD Ethernet adapter to be listed. The new device can be identified from its MAC address and no check mark will be displayed in the Device Name column for that device..
7. Click on the checkbox for the new device to display a check mark.
8. If desired, change the device name, by clicking the **Rename** button and typing a descriptive name.
9. Select the **Security** tab.
10. Re-enter your private network ID in the **Network ID** text box.
11. Click the **Set All Devices** button. The utility should display a pop-up window indicating that the operation was successful.
12. Select the **Main** tab and click the **Scan** button. Check that all devices are detected with you private network ID.

How to Prioritize Traffic on the Powerline Network

By default, all types of traffic on the Powerline network are assigned the same priority. For most applications, this setting is adequate. However, there are situations where it is desirable to assign a higher priority to certain types of traffic, such as multimedia files.

How to Prioritize Traffic by General Application Type

If your network traffic is a mix of multimedia and document/database traffic you may want to give priority to a particular traffic type. If it is important that your multimedia playback is smooth, even while document files are being transferred over the network, you may want to give priority to multimedia traffic. Conversely, if it is more important for your network to be responsive to database applications, you may want to give priority to this type of application over multimedia applications.

In general, multimedia applications use UDP (User Datagram Protocol) for data transfer. For such applications, the on-time arrival of the data is more important than the data itself. If a packet cannot be transferred in time, it will be dropped. For applications where the integrity of the data takes precedence over the data timing, such as database applications, TCP (Tranmission Control Protocol) is used for data transfer. The easiest way to give priority to multimedia traffic, is to assign high priority to UDP transfers. To give priority to database applications, assign high priority to TCP transfers.

To set the priority of data transfers by the type of protocol:

1. Start the HDX101 Configuration Utility from the PC and wait for the utility to detect the Powerline HD Ethernet adapters connected to the computer.
2. Select the **QoS** (Quality of Service) tab.

> **Note:** Changes to QoS settings will be applied to every detected device shown on the Main tab, independent of the settings of the checkboxes in the Device Name column.

3. In the "Configure Advanced QoS Settings" section, give priority to multimedia transfers by selecting **UDP priority** and **UDP high priority** in the Rule list boxes.

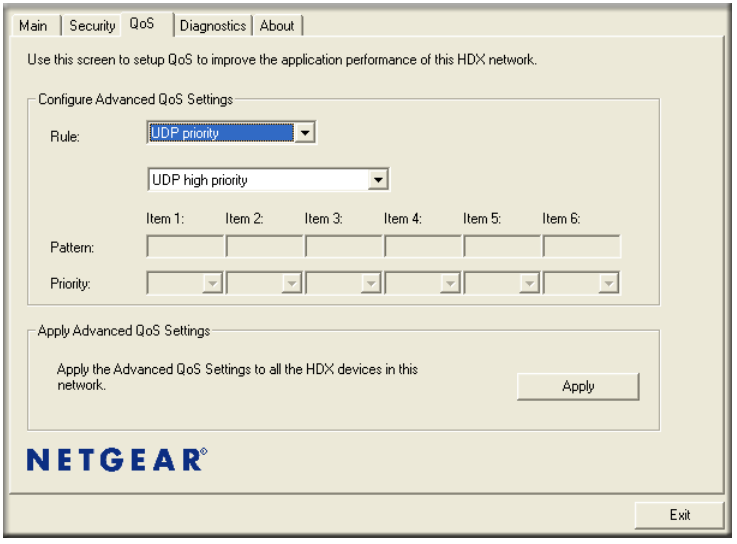

Figure 2-28

Otherwise, to give priority to database or document transfers, select **TCP priority** and **TCP high priority** in the Rule list boxes.

4. Click the **Apply** button to set the traffic prioritization rule into all Powerline HD Ethernet adapter devices.

Advanced QoS Options

How to Give Priority to a Specific Application

If you want to prioritize network traffic for a specific application, you need to know the source or destination ports used, in addition to the protocol. If you do not know the protocol and ports used, use a network protocol analyzer program[1] to monitor your network traffic while running the application you want to prioritize.

Scenario: A Storage Central SC101 is connected to one Powerline HD Ethernet Adapter and a PC is connected to another. An HDTV file is stored in the SC101, and Media Player on the PC is used to play the HDTV file.

While the video file is being played, the PC user copies a large data file from the PC to the SC101 and from the SC101 to the PC. Without traffic prioritization, video playback will be delayed or interrupted.

Note: The SC101 uses UDP port 20001 for multimedia data transfers.

To adjust traffic prioritization for smooth playback for the application in the scenario:

1. Start the HDX101 Configuration Utility from the PC and wait for the utility to detect the Powerline HD Ethernet adapters connected to the computer.
2. Select the **QoS** (Quality of Service) tab.
3. Set the QoS options in the “Advanced QoS Options” section. For the scenario above, the SC101 provides the source port for the data transfer, and the media player provides the destination port. For this application, select the following options:
   - Select **UDP priority** and **UDP source port priority** in the Rule list boxes.
   - In the “Item 1” column, type the SC101 UDP port number, **20001**, in the UDP Port text box.

1. Not included with the HDX101 Powerline HD Ethernet Adapter.

- If necessary, change the priority. The highest priority you can assign is **6**, and the lowest is **1**.

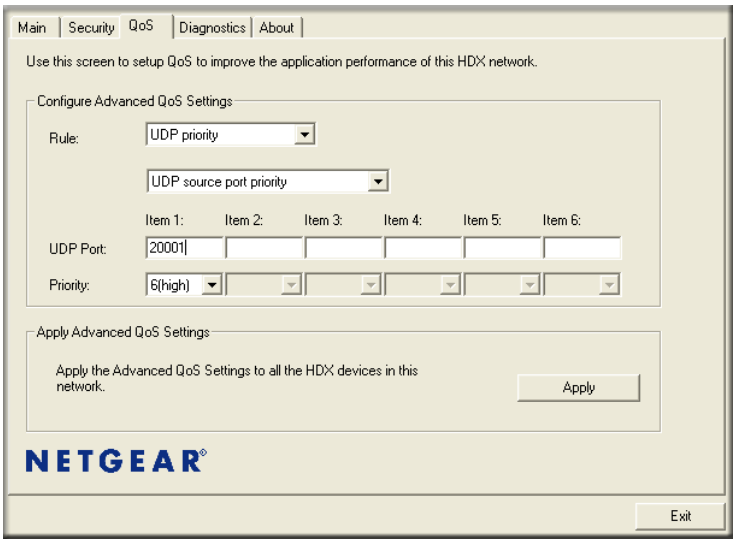

Figure 2-29

4. Click the **Apply** button to set the traffic prioritization rule into all Powerline HD Ethernet adapter devices.

Other QoS Options

Besides UDP and TCP priority, the Powerline HD Ethernet adapter offers the following QoS rule options:

- 802.1p prioritization
- TOS
- DSCP

These options only apply to QoS-configured business networks. IEEE 802.1p uses prioritization bits in Layer-2 frames. TOS and DSCP use prioritization bits in Layer-3 IP packets. DSCP (Differential Services Code Point) values range from 0 to 63; the deprecated TOS (Type Of Service) values range from 0 to 7.

Chapter 3
Troubleshooting

This chapter gives information about troubleshooting your HDX101 Powerline HD Ethernet Adapter. After each problem description, instructions are provided to help you diagnose and solve the problem.

NETGEAR Product Registration, Support, and Documentation

Register your product at *http://www.netgear.com/register*. Registration is required before you can use our telephone support service.

Product updates and Web support are always available by going to: *http://kbserver.netgear.com*.

When the Powerline HD Ethernet adapter is connected to the Internet, click the Knowledge Base or the Documentation link under the Web Support menu to view support information or the documentation for the Powerline HD Ethernet adapter.

Basic Functioning

After you turn on power to the HDX101 devices, the following sequence of events should occur:

1. When power is first applied, verify that the Power light is on.
2. After approximately 10 seconds, verify that:
    a. The power light is solid green.
    b. The blue Powerline Link LED is lit.
    c. The Ethernet port on the HDX101 lights or blinks.

If any of these conditions does not occur, refer to the appropriate following section.

Power Light Not On

Make sure that, if power to the AC power outlet is controlled by a wall switch, the wall switch is in the **on** position.

Verify that the wall socket is live by disconnecting the HDX101 Powerline HD Ethernet Adapter and plugging in some other electrical product, such as a lamp or a hair dryer.

If the error persists and you have confirmed the power outlet you are using is live, you have a hardware problem and should contact technical support.

Powerline Link Light Not On

If the power light is on but the Powerline Link light is not, check the following:

- Make sure that power is being provided to more than one Powerline device. Another Powerline device must be installed for successful communication across the Powerline.
- Verify that the network ID is the same on all devices in the Powerline network.

Ethernet Light is Off

- Make sure that the Ethernet cable is plugged in properly at both ends.
- Be sure you are using the correct cable on the router that the first HDX101 is connected to. When connecting the router's Internet port to a cable or DSL modem, use the cable that was supplied with the cable or DSL modem. This cable could be a standard straight-through Ethernet cable or an Ethernet crossover cable.
- On attached Ethernet device or network adapter card, check that the Link light is on.

Problems after Changing Network ID

If your Powerline devices stopped communicating after using the NETGEAR HDX101 Configuration Utility to change the newtork ID, proceed as follows:

1. Open the NETGEAR HDX101 Configuration Utility and select the **Security** tab.
2. Click the **Use Default** button and then the **Set All Devices** button.
3. Select the **Main** tab, and check that the utility detects all the HDX101 devices in your Powerline network.

4. If the utility detected all your Powerlin devices in step 3, examine the status of the checkboxes in the Device Name column.

   a. Click each empty checkbox until a check mark is displayed for every device.

   b. Select the **Security** tab, type the Network ID you want to assign in the “Set Network ID” text box and click the **Set Selected Devices** button.

   c. Select the **Main** tab, and click the **Scan** button. Check that the utility detects all your Powerline devices. If all devices are displayed, your network is ready to use. If the utility fails to detect all the devices, proceed with step 5 below.

5. If the utility does not detect all the devices, you will need to connect your computer to each Powerline device and set up the network ID one at a time, as folllows:

   a. Select the **Security** tab in the window displayed by the NETGEAR HDX101 Configuration Utility.

   b. Type the Network ID you want to assign in the “Set Network ID” text box and click the **Set Local Device** button.

   c. Select the **Main** tab and click the **Scan** button. Check that the utility detects all the devices that have been individually set to the same network ID.

Appendix A
Technical Specifications

This appendix provides technical specifications for the HDX101 Powerline HD Ethernet Adapter.

Network Protocol and Standards Compatibility	
Data and Routing Protocols:	IEEE 802.3 (10BASE-T), IEEE 802.3u (100BASE-Tx)
Power	
Power Consumption:	6.3W
Physical Specifications	
Dimensions:	Height: 98 mm Width: 72 mm Depth: 40 mm
Weight:	0.5 lbs. 0.2 kg
Environmental Specifications	
Operating temperature:	0° to 40° C (32º to 104º F)
Operating humidity:	10-90% maximum relative humidity, noncondensing
Storage humidity	5-95% maximum relative humidity, noncondensing
Security	
Encryption type:	DES/3DES
Bridge Performance	
MAC addresses:	32
Bandwidth	200 Mbps
Powerline Performance	
Compatibility:	Not HomePlug v1.0 or HomePlug v1.0 Turbo compatible
Data Transfer Rate:	Up to 200 Mbps with real throughput greater than 80 Mbps
Frequency band:	2-32 Mbps
Modulation type:	OFDM symbol modulation

Electromagnetic Emissions	
Meets requirements of:	FCC Part 15 Class B; CE-EMC Class B; 3-home FCC Certificate
Safety Agency Approvals	
Meets requirements of:	UL Listed (UL 1950) /cUL IEC950; CE LVD